

ABSTRACT

A thermal barrier coating material formed of a highly defective cubic matrix structure having a concentration of a stabilizer sufficiently high that the oxygen

5 vacancies created by the stabilizer interact within the matrix to form multi-vacancies, thereby improving the sintering resistance of the material. The concentration of stabilizer within the cubic matrix structure is greater than that concentration of stabilizer necessary to give the matrix a peak ionic conductivity value. The concentration of stabilizer may be at least 30 wt. %. Embodiments include a cubic matrix of zirconia
10 stabilized by at least 30-50 wt. % yttria, and a cubic matrix of hafnia stabilized by at least 30-50 wt. % gadolinia.